Mucilage ducts in Pipereae.—In considering the genera of the Piperaceae, two tribes are recognized by VAN TIEGHEM,[17] namely Pipereae and Peperomieae; while the Saururaceae are kept as a distinct family, as suggested a hundred years ago by L. CL. RICHARD. By CASIMIR DECANDOLLE the Saururaceae were replaced in Piperaceae as a tribe; and then separated by ENGLER. In speaking of Piperaceae, therefore, VAN TIEGHEM does not include Saururus and its allies. From an anatomical point of view the Piperaceae have long attracted much attention, especially on account of peculiarities in stem structure, which at the same time are characteristic of the respective tribes. For instance, in the Pipereae the stem exhibits a normal monostelic structure, with the broad stele surrounded by a well-differentiated endodermis, and possesses at least two concentric bands of mestome bundles. In the Peperomieae, on the other hand, the stem structure is of the schizostelic type, the numerous meristeles being scattered, not arranged in bands, and each being provided with a special endodermis. Common to both tribes, however, is the presence of roundish oil cells with the cell wall suberized or at times lignified; these oil cells are widely distributed through stem and leaf. In certain Pipereae still another secreting system occurs, which is now for the first time described. It consists of a single duct or several broad ducts containing mucilage and extending through the full length of stem and leaf; these ducts are lysigenous, since they arise from the destruction of a row of secreting cells. They occur in the pith of the stem, mostly a very broad one in the center and several narrower ones in a band around this and alternating with the innermost mestome strands. They contain a colorless mucilage, and are surrounded by small cells, notably smaller than those of the surrounding pith parenchyma. This system of secretory ducts belonging to the stem stele is readily followed through the internodes, but disappears completely in the nodes. In the leaf these ducts occur in the petiole, in the parenchyma located on the ventral (the hadromatic) face of the arch formed by the mestome strands; thence they may be traced in the midrib of the leaf blade, from the base to apex. Although the author examined various representatives of the Peperomieae, he failed to detect the ducts in any of them. Among the Pipereae they occur in Piper (as in *P. nigrum*, *P. Cubeba*, *P. macrophyllum*, etc.), in *Chavica Blumei*, *C. sphaerostachya*, and some species of Heckeria; while they are not developed in Macropiper, Nematanthera, and Zippelia.—THEO. HOLM.

Studies in aquatic plants.—FRANÇOIS[18] has offered a very interesting contribution to the knowledge of aquatic plants with notes on their structure, external as well as internal, and on their seedlings, the text containing many well-drawn figures. Special attention is given to the vegetative reproduction of such

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[17] VAN TIEGHEM, PH., Sur les canaux à mucilage des Piperées. Ann. Sci. Nat. Bot. IX. 7:117. 1908.

[18] FRANÇOIS, L., Recherches sur les plantes aquatiques. Ann. Sci. Nat. Bot. IX. 7:25. 1908.